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EXAMINER

DOLLINGER, MICHAEL M

ART UNIT

PAPER NUMBER

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|------------------------------------|--|
| Office Action Summary | Application No. 10/541,126 | Applicant(s) PARK ET AL. | |
| | Examiner MICHAEL DOLLINGER | Art Unit 4171 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>06/29/2005</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Objections

1. Claim 9 is objected to because of the following informalities: the term "poly(tetramethylene oxide) carboxylate" is inconsistent with the antecedent term "poly(tetramethylene oxide) terephthalate in claim 1. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
3. Claims 1-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
4. Regarding claim 1, applicants limit the dot impact strength, Izod notch patch impact strength, tensile strength, and dispersion morphology of the toughened polyoxymethylene resin composition. However, dot impact strength, Izod notch patch impact strength, tensile strength, and dispersion morphology are not properties of a composition but rather the properties of a composite material or formed article of a composition. These properties are determined by the processing of a material or formed article. These limitations are indefinite because they do not limit the claimed composition.
5. Furthermore, it is unclear whether the limitations on dot impact strength, Izod notch patch impact strength, and tensile strength are referring to the polyethylene

component (c) or referring to the claimed toughened polyoxymethylene composition.

Appropriate correction of the claim language is required.

6. Furthermore, the limitation on dispersion phase morphology refers to the testing method as “when a molded article of the composition is broken at low temperatures”. Examiner notes that this is not the customary terminology for this test method of polymer composite morphology. Examiner suggests that claim language be amended and include the term “fracture plane” when referring to the surface of the broken article that is viewed to ascertain the dispersion morphology.

7. The term "low temperatures" in claim 1 is a relative term which renders the claim indefinite. The term "low temperatures" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

8. Regarding claim 9, applicants limit the amount of poly(tetramethylene oxide) carboxylate unit used to 30 to 80 weight percent. This limitation is indefinite because it is not clear what the weight percent is in relation to. For purposes of examination, Examiner takes the position that the amount of poly(tetramethylene oxide) carboxylate unit is limited to 30 to 80 weight percent of the polyether-ester block copolymer component (b).

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1-4 and 6-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Burg et al. (US 4,277,577).

11. Regarding claim 1, applicants claim a polyoxymethylene resin composition comprising (a) 100 parts by weight of polyoxymethylene, (b) 5-60 parts by weight of a polyether-ester block copolymer comprising (b1) a hard segment derived from a dicarboxylic acid component and a glycol component and (b2) a soft segment including a poly(tetramethylene oxide) terephthalate unit, and (c) 0.1-10 parts by weight of a modified polyethylene polymer. Burg et al. disclose a molding composition comprising (a) 99.89-60 weight percent of oxymethylene polymer (column 1 lines 41-42), (b) 0.01-20 weight percent of a segmented thermoplastic copolyester (column 1 lines 48-49) comprising (b1) a segment derived from dicarboxylic acid units such as terephthalic acid and isophthalic acid and diol units such as butanediol-(1,4) (column 6 line 14) and (b2) polyoxolane having terminal hydroxyl groups (column 6 lines 11-14) which will react with terephthalate acid units to correspond to the poly(tetramethylene oxide) terephthalate unit, and (c) 0.1 to 40 weight percent of an elastomer (column 1 line 43) which may be a homopolymer of polyethylene (column 4 lines 39-40).

| Component | wt % Range in Present Application | wt % Range in Burg et al. |
|-----------|---|------------------------------|
| a | 95.1-58.8 | 99.89-60 |
| b | 4.3-37.5 | 0.01-20 |

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c 0.062-8.7 0.1-40
Comparison of ranges of amounts of components in weight percent

12. Regarding claim 2, applicants claim the dicarboxylic acid component comprising terephthalic acid alone, or a mixture of terephthalic acid and any one of aromatic dicarboxylic acid and alicyclic dicarboxylic acid. Burg et al. disclose the dicarboxylic acid component as a mixture of terephthalic acid and isophthalic acid (column 6 line 14) corresponding to a terephthalic acid and aromatic dicarboxylic acid mix.
13. Regarding claim 3 applicants claim the dicarboxylic acid component comprising a mixture of 70 wt % or more of terephthalic acid and 30 wt % or less of any one selected from the group consisting of aromatic dicarboxylic acid, alicyclic dicarboxylic acid, and mixtures thereof. Burg et al. disclose the copolyester component (b) prepared from 390 parts by weight (79.6 wt %) of terephthalic acid dimethyl ester and 100 parts by weight (20.4 wt %) of isophthalic acid dimethyl ester (column 9 lines 46-48).
14. Regarding claim 4, applicants claim the aromatic dicarboxylic acid selected from the group consisting of isophthalic acid, phthalic acid, naphthalene-2,6-dicarboxylic acid, diphenyl-4,4'-dicarboxylic acid, 3-sulfoneisophthalic acid, and mixtures thereof. Burg et al. disclose the dicarboxylic acid chosen from the group comprising isophthalic acid (column 5 line 27), naphthalene-2,6-dicarboxylic acid (column 5 line 28), 4,4'-dicarboxydiphenyl (column 5 lines 29-30) corresponding to diphenyl-4,4'-dicarboxylic acid.
15. Regarding claim 6, applicants claim the glycol component comprising 1,4-butanediol alone, or 50 wt % or more of 1,4-butanediol and 50 wt % or less of a copolymerizable component selected from the group consisting of ethylene glycol,

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diethylene glycol, propylene glycol, 1,6-hexanediol, 1,10-decanediol, 1,4-dihydroxymethyl cyclohexane, bis(4-hydroxyethoxyphenyl) methane, neopentyl glycol, and mixtures thereof. Burg et al. disclose the diol component made from a single diol or a mixture of diols (column 6 lines 5-6) selected from the group comprising ethylene glycol (column 5 line 68), diethylene glycol (column 5 line 68), propanediol (column 6 line 1) corresponding to propylene glycol, hexanediol-(1,6), decanediol-(1,10) (column 6 line 3), 1,4-dihydroxymethyl-cyclohexane (column 6 lines 3-4), and butanediol-(1,4) (column 6 line 2). If a mixture of diols is used, at least 50% of the total number of diols must be identical (column 6 lines 6-10).

16. Regarding claim 7, applicants claim the soft segment component (b2) comprising poly (tetramethylene oxide) glycol constituting the poly (tetramethylene oxide) terephthalate unit. Burg et al. disclose the copolyester containing a segment of polyoxolane having terminal hydroxyl groups (column 6 lines 11-12).

17. Regarding claim 8, applicants claim the poly (tetramethylene oxide) glycol having a number average molecular weight of 500-20,000. Burg et al. disclose the polyoxolane glycol with a numerical average molecular weight of 800 to 2,000 (column 6 lines 12-13).

18. Regarding claim 9, applicants claim the poly(tetramethylene oxide) carboxylate unit component (b2) used in an amount of 30 to 80 wt %. Burg et al. disclose the copolyester component (b) with the polyoxolane component (b2) used in an amount of 41 wt % (column 9 lines 45-53).

Claim Rejections - 35 USC § 102/103

19. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

20. Claims 1-4 and 6-9 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Burg et al. (US 4,277,577).

21. In claim 1, from which all other claim directly or indirectly depend, applicants claim the polyoxymethylene resin composition having a dot impact strength not less than 5 J, an Izod notch patch impact strength not less than 10 kgcm/cm, and a tensile strength not less than 550 kg/cm², wherein the resin has a dispersion phase amounting to 2 to 5 µm when a molded article of the composition is broken at low temperatures. These limitations are inherent properties that depend on the chemical formulae and amounts of components present in the composition.

22. Burg et al. are silent with respect to these inherent properties of the disclosed molding compositions. However, as discussed above the chemical formulae and amounts of components of the disclosed composition are substantially identical to those of the claimed composition of the present application.

23. When the prior art discloses a product that seems to be substantially identical to the claimed invention but is silent as to an inherent characteristic recited in the claims, burden of proof is shifted to the applicant to show an unobvious difference, see MPEP § 2112.

Claim Rejections - 35 USC § 103

24. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Burg et al. (US 4,277,577) as applied to claims 1-3 above, and further in view of Kinkelin et al. (US 6,255,443 B1).
25. Applicants claim the dicarboxylic acid mixture of component (b1) wherein the alicyclic dicarboxylic acid is selected from the group consisting of oxalic acid, succinic acid, adipic acid, azellic acid, sebacic acid, dodecanoic acid, dimer acid, and mixtures thereof.
26. Burg et al. discussed above do not disclose a dicarboxylic acid mixture including an alicyclic dicarboxylic acid or any of the alicyclic dicarboxylic acids claimed in claim 5.
27. Kinkelin et al. teach that copolyesters based on terephthalic acid, adipic acid, butane-1,4-diol and hexane-1,6-diol (column 2 lines 1-2) may be combined with aliphatic polymers (column 2 line 2-3) and result in copolyesters with low melting points, high crystallization speed, high flexibility, and high chemical stability all of which may be optimized through suitable combination of the components (column 2 lines 58-62).
28. The backbone of a polyester composed of aliphatic dicarboxylic acids will be much more flexible than the backbone of a similar polyester composed of aromatic dicarboxylic acids alone due to the larger amount of steric hindrance and normalized

bonds in the aromatic dicarboxylic acids. The more flexible backbone in an aliphatic/aromatic dicarboxylic acid containing copolyester provides lower melting points, lower viscosity during melt processing, greater miscibility with other aliphatic-backboned polymers, and other desirable properties. It is well known to one of ordinary skill in the art that including aliphatic dicarboxylic acids with aromatic dicarboxylic acids in a polyester backbone will provide a lower melting point, lower viscosity during melt processing, greater miscibility with other aliphatic-backboned polymers, and other desirable properties.

29. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the copolyester component of Burg et al. by adding aliphatic dicarboxylic acids to dicarboxylic acid components and specifically to add adipic acid as taught by Kinkelin et al because Burg et al. teach that it is within the skill of the art to blend a copolyester component derived from dicarboxylic acids and glycols with oxymethylene polymer and polyethylene and Kinkelin et al. teach that it is within the skill of the art to produce an improved polyester from an adipic acid and terephthalic acid mixture. One would modified the copolyester of Burg et al. in this way to lower the melting point and henceforth improve the melt-processibility in the oxymethylene polymer molding composition of Burg et al. and improve the miscibility of the copolyester with the oxymethylene polymer and polyethylene elastomer components. Absence any evidence to the contrary, there would have been a reasonable expectation of success in adding an adipic acid to the dicarboxylic acid

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mixture from which the copolyester of Burg et al. is derived to arrive at the invention as claimed in claim 5 or the present application.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL DOLLINGER whose telephone number is (571)270-5464. The examiner can normally be reached on Monday - Thursday 7:30AM-6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry Tarazano can be reached on 571-272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. Lawrence Tarazano/
Supervisory Patent Examiner, Art Unit 4171

MICHAEL DOLLINGER
Examiner
Art Unit 4171

/MMD/